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or ten days from the escape from the egg, these favored few were fifty per cent. larger than their weaker comrades who were born upon the same day. Their mouths had by this time increased so much in size that they were no longer satisfied with nibbling off the gills of their brethren, but now began to swallow them bodily. This great increase in the supply of food soon produced a marked effect upon those who were thus supplied; so that in ten days from the time that they began to feed in this way they were from ten to twelve times the length and bulk of those upon whom they were feeding. Developing at this rapid rate, they arrived at the stage when the gills are re-sorbed and the abranchiate form leaves the water for the marshy land or old, damp log, where it usually makes its home and where it would find a supply of more natural food-material.

Here then was a very interesting case of natural selection, by survival of the fittest. All the weaker individuals being destroyed and actually aiding the stronger ones by serving them as food until they could pass through their changes and escape to other regions where food was more abundant.

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RECENT LITERATURE.

FLÖGEL ON THE STRUCTURE OF THE BRAIN IN DIFFERENT ORDERS OF INSECTS.—The Supplementary Heft for May 28th of Siebold and Kölliker's *Zeitschrift für Wissenschaftliche Zoologie* contains an elaborate article by J. H. L. Flögel, illustrated by a number of micro-photographs. This and Dietl's excellent paper, published in 1876, are the only treatises on the minute structure of the brain of insects, Owskianikof having studied that of the spiny lobster (Palinurus) several years ago, while Dietl studied the brain of Astacus. Flögel establishes three points as the results of his researches.

First, the constant presence of the remarkable central body in the mature insects of all orders, while it is almost absent in the larvæ of Lepidoptera (but not in Hymenopterous larvæ). We are thus led to suppose that it has something to do with the formation of the faceted eyes. If it has any relation with the bundle of fibres passing from the optic lobe, there is nothing to indicate it.

Secondly, the size of the olfactory lobe, with its olfactory bodies, correlated in insects with small antennæ entirely unfit for tasting, but on the contrary with a very completely developed sense of smell, is in the author's opinion an excellent proof of the correctness of Leydig's view that the antennæ are organs of smell, whatever may be brought forward in opposition to it. If they are to be interpreted as an apparatus for detecting sounds,

we, on the other hand, are acquainted with the finer structure of the organs of hearing in the Orthoptera, and know that they have no such constituted brain-centres as the olfactory lobes.

Thirdly, Flögel draws attention to the wonderful and so little understood facts that in insects, where the lobes ("bechers" of Flögel, "lappen," "gestielte körper," etc., of Dietl) and the substance around it (gerüst) constitute the greater part of the brain, there is indeed no connection of the nerve-fibres to be found with the remaining parts of the brain, and consequently also with the œsophageal commissures. The opinion that the ganglionic cells are in direct relation through fibres with the organs of the body is provisionally unfortunately contradicted. But where are the intermediate stations? he asks.

Finally, the author claims that the essay indicates the outlines of a future brain-topography for insects, and shows that the single parts of the brain have their homologues in the different orders of insects; consequently a ground-plan in the organization is not to be mistaken, and thus a comparative anatomy of the brain of insects is outlined comparable with that of the vertebrates, as established by the researches of Stieda.

BARROIS' EMBRYOLOGY OF BRYOZOA.[1]—The author of this elaborate and beautifully illustrated memoir is well-known for his able and thorough work on the development of the sponges and nemertean worms. A large number of typical forms of Polyzoa or Bryozoa, as the German and French call them, have been studied, and the different stages figured, including the genera Loxosoma, Pedicellina, and several genera of higher marine forms. We will give the general results of our author's work condensed from the *résumé général*. A study of the different groups of Chilostomatous and Cyclostomatous Polyzoa, shows that their development presents the same phenomena, characterized by the great regularity of the segmentation (*morula*) and giving rise to a *blastula*, in which the advanced morula is composed of two distinct halves (oral and aboral) separated by a crown of cilia. Then the *gastrula* state is assumed and afterwards the mesoderm arises. At the moment of birth, the embryo always withdraws the aboral end within the crown and thus assumes a discoidal aspect, but it can undergo this process much more rapidly, previous to the appearance of the fur-

FIG. 1. FIG. 2.

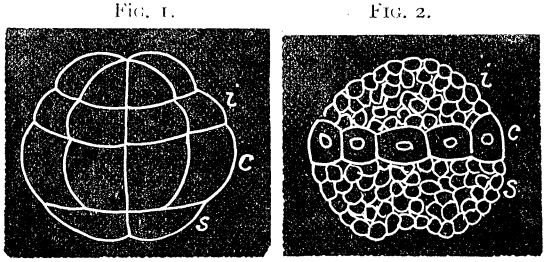

FIG. 1.—Blastula of *Alcyonidium mytili*. FIG. 2.—Gastrula of the same; *c*, beginning of crown.

[1] *Recherches sur l'Embryologie des Bryozoaires*. Par J. BARROIS. Lille, 1877. °, pp. 305, with 16 plates.